

Study
Report
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Downsizing the Army's Active Enlisted Force: Implications for Rotation Patterns and Associated Personnel Policies

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**A Field Operating Agency Under the Jurisdiction
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Research accomplished under contract
for the Department of the Army

Lewin-Value Health Incorporated

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14. ABSTRACT (Maximum 200 words): The drawdown of the active duty Army following the end of the Cold War has come disproportionately from overseas positions. As such it is both a drawdown and a restructuring. This shift to a more continental U.S.- (CONUS-) based force could lead to unacceptable long tours in CONUS TDA positions, mismatches between the rank and skills of assigned personnel, and difficulty in transporting soldiers to obtain required professional development and training. Using a variety of simulation models, the effect of the changing authorization structure on average CONUS time on station, the number of rotational moves, and other variables was analyzed. Alternative methods to offset the effects of the change in billet structure, including changes in OCONUS tour lengths, increases in CONUS to CONUS operational moves, and a combination of the two methods were studied. The policies examined to offset potential CONUS stagnation appear more than adequate. For example, a policy of reducing OCONUS tour length by 1 year significantly increases rotational moves and reduces average CONUS time on station, by FY 1998, to below what it would have been had there been no change. Overall, the simulations suggest that the potential problems posed by the change in authorization structure will not be severe and that policies can be adapted to offset any potentially adverse effects.					
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**Personnel and Training
Analysis Activities**

DOWNSIZING THE ARMY'S ACTIVE ENLISTED FORCE; IMPLICATIONS FOR ROTATION PATTERNS AND ASSOCIATED PERSONNEL POLICIES

FOREWORD

Army management is concerned about the effects on personnel readiness of a smaller continental US (CONUS) -based force. A smaller CONUS-intensive force is expected to decrease the number of rotational moves (moves between CONUS and overseas) and increase the average time on station for soldiers in CONUS positions. Without policy changes the new circumstances may adversely impact force readiness. This study analyzes the effects of changes in the authorization structure and develops alternative ways to offset the effects of the changes.

The Selection and Assignment Research Unit of the U.S. Army Research Institute for the Behavioral and Social Sciences conducted this study under Task 1331, "Personnel Policy Analysis," as part of the Study and Analysis (6.6) program. The Directorate of Military Personnel Management (DMPM) requested this study. The findings of this study were briefed and provided to the Enlisted Division of DMPM. These findings were used to specify policies for examination that offset potentially adverse effects of the drawdown on the professional development and training of soldiers.

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Downsizing the Army's Active Enlisted Force; Implications for Rotation Patterns and Associated Personnel Policies

EXECUTIVE SUMMARY

Research Requirement:

With the end of the Cold War and the demise of the Soviet Union, the Army and the other Services have been downsizing dramatically. In addition to an overall decline in authorized positions, the decline in the Army has been disproportionately greater in overseas positions -- a restructuring of the force. The pre-drawdown force structure consisted of about 55% continental US positions (CONUS) and 45% of positions outside the continental US (OCONUS). By FY 1998, positions will have shifted to 71% CONUS and 29% OCONUS.

This relative shift toward a more CONUS intensive force can, if there are no other offsetting factors, be expected to: (1) significantly decrease the number of rotational moves; and (2) increase the average time on station for soldiers in CONUS positions.¹ In addition, there is an imbalance in the authorized grade structure between CONUS TDA units and CONUS TOE units.² TDA units tend to be more senior grade intensive. Hence, to the extent that TDA and TOE units are at different locations, the reduced rotational moves are likely to generate mismatches between individual rank and authorized grades on CONUS units. Without additional CONUS to CONUS operational moves, or other policy changes, the force may become unbalanced. In particular, increased CONUS time on station may:³

- reduce effectiveness in the performance of those TDA (indirect support) functions where recent field experience is important;
- result in a decline in the combat skills of those assigned to CONUS TDA units;
- generate force imbalances, with mismatches between recently promoted NCOs and the authorized grade structure.

¹ It is ironic that increases in time on station are, in our context, considered undesirable. In other contexts, such increases mean that personnel turbulence has been reduced, and that the "down" time and period of low productivity surrounding moves to new assignments are reduced. However, in this context, increased time on station in CONUS TDA units means that the soldier will experience longer periods between combat unit assignments. This suggests that there may be a deterioration in combat skills of some soldiers if assigned to TDA units for extended periods.

² "TDA" units are units whose organization is documented by a Table of Distribution and Allowances (TDA) while "TOE" units are those whose organization is documented by a Table of Organization and Equipment (TOE). In practical terms, TDA units are non-combat indirect support organizations that provide services such as formal school house training, recruiting, and base operation and support. TOE units are combat units.

³ See "Enlisted Assignment Pattern Vision," unclassified briefing by Army Personnel Command, undated.

Procedure:

In this report, we simulate the effects of changes in authorization structure on rotational moves and average time on station (TOS) using models of the assignment and CONUS-OCONUS rotational move process. A limited dimension simulation model, but one especially designed to estimate the policies and effects that are important to this analysis, is developed in a software simulation package called *ithink*. We perform the simulation using the *ithink* model and two existing personnel-related models, the Army Flow Models of the Blacksmith model and TAPLIM model.

In our analyses, we explicitly consider five primary cases. The first case is a "baseline" under which the *authorization structure* is held constant at its FY 1993 level throughout the simulation. Personnel policies are also held constant. In the second case, also considered a baseline, personnel policies are also held constant as the authorization structure between FY 1993 and 1998 changes according to the Army's plan, with the proportion of OCONUS positions declining to 29% by FY 1998. The last three cases simulate the effects of alternative policies to offset the effect of planned authorization structure on CONUS time-on-station.

The estimated effects of the five cases on (1) the number of rotational moves; and (2) average time-on-station are presented in the following tables. Where possible, we compare the estimates from the *ithink* model with those of TAPLIM. There are two definitions of CONUS "average time-on-station": (1) average time-on-station for those who move in a particular year and (2) "average time on station" for the stock or inventory of personnel in CONUS. In periods where there are no, or only a few, moves, the first definition may be undefined, or provide a misleading indication of CONUS stagnation. Therefore, we use the second definition of average CONUS time on station in our analysis.

Findings:

Based on our analyses, we conclude that:

- Changes in authorization structure will, all else being equal, reduce the number of rotational moves
 - TAPLIM and *ithink* models estimate the reduction in rotational moves, relative to the numbers of rotational moves if the FY 1993 authorization structure were to remain constant at about 20-30%, but reduction depends on the years compared
- Average time on station in CONUS will increase, but not dramatically
 - ithink* estimates about 0.2 per year for junior personnel, to over 0.5 per year for mid-level and senior personnel

-A policy of reducing OCONUS tour lengths by 1 year, on average, is more than sufficient to offset the effect of authorization structure changes on TOS

-The policy comes at a (high) cost of roughly a 60-70% increase in rotational moves, relative to current policy, and a 10-15% increase relative to 1993 billet structure and policies

- A CONUS-TDA to CONUS-TOE maximum time on station rotation policy when time on station (TOS) exceeds 4 years will similarly reduce average TOS to pre-drawdown levels, but at annual cost of about 20,000 operational moves
- A "hybrid" policy, of modestly decreasing OCONUS tour lengths and establishing the maximum CONUS TOS at 5 years will also eliminate CONUS stagnation, at a cost of roughly 5,000-10,000 more rotational moves and about 5,000 operational moves
- TAPLIM and *ithink* are in rough agreement regarding direction and order-of-magnitude of effects
- The Blacksmith model simulations suggest that the changing authorization structure will not result in a decrease in personnel readiness, as measured by the proportion of units reporting below C-2⁴

⁴ The C-2 rating indicates that a unit possesses the resources and has accomplished the training necessary to undertake the bulk of the wartime mission for which it is organized or designed.

Downsizing the Army's Active Enlisted Force; Implications for Rotation Patterns and Associated Personnel Policies

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Downsizing the Army's Active Enlisted Force; Implications for Rotation Patterns and Associated Personnel Policies

Introduction and Overview

Background

Throughout most of the post-World War II period, the Army has kept significant numbers of its troops deployed in overseas positions, primarily in Europe and in South Korea. Soldiers are stationed in these overseas positions for fixed tour lengths that balance the cost and readiness implications of frequent moves and assignment changes with the potential cost to the soldier and his or her family of being stationed outside of the continental United States. The policy rationale associated with rotational permanent change of station (PCS) moves is generally accepted within the Army, and by the Office of the Secretary of Defense and Congress.

Throughout most of the Cold War era, a typical Army twenty-year career consisted of a sequence of rotations between duty stations overseas and duty stations in the continental United States. About 40% of the typical soldier's twenty-year career was spent in overseas positions. Rotational moves and policies associated with rotation between the continental US (CONUS) and overseas positions (OCONUS) were justified based on the necessity of keeping overseas positions staffed with qualified personnel, while keeping overseas tours sufficiently short to minimize the costs imposed on individual soldiers and their families. As a result, a large number of personnel policies associated with training, promotion, distribution, and readiness evolved around the rotational patterns associated with staffing overseas positions.

Within the overall envelope of rotational moves required to staff overseas positions a large number of additional functions were accomplished.¹ For example, soldiers would obtain the professional development training needed for promotion (advance noncommissioned officer course (ANCOC), basic noncommissioned officer course (BNCOC)) by stopovers enroute during a rotational move. Normal overseas rotation requirements insured that combat-trained soldiers assigned to indirect support positions in the continental US (e.g., administrative positions, training, recruiting) would be rotated back to a combat unit before their combat skills atrophied. Soldiers recently promoted would be assigned to an authorized position that matched their new rank as a part of the normal rotation process.

With the end of the Cold War and the demise of the Soviet Union, the Army and the other Services have been downsizing dramatically. In addition to an overall decline in authorized positions, the decline in the Army has been disproportionately greater in overseas positions -- a restructuring of the force. The pre-drawdown force structure consisted of about 55% continental

¹ For some soldiers, assignments in Europe, Korea or other overseas duty stations are not a hardship. But it is generally considered that, for the typical member and his or her family, an overseas assignment for an extended period is a hardship.

US positions (CONUS) and 45% of positions outside the continental US (OCONUS). By FY 1998, positions will have shifted to 71% CONUS and 29% OCONUS.

This relative shift toward a more CONUS intensive force can, if there are no other offsetting factors, be expected to: (1) significantly decrease the number of rotational moves; and (2) increase the average time on station for soldiers in CONUS positions.² In addition, there is an imbalance in the authorized grade structure between CONUS TDA units and CONUS TOE units.³ TDA units tend to be more senior grade intensive. Hence, to the extent that TDA and TOE units are at different locations, the reduced rotational moves are likely to generate mismatches between individual rank and authorized grades on CONUS units. Without additional CONUS to CONUS operational moves, or other policy changes, the force may become unbalanced. In particular, increased CONUS time on station may:⁴

- reduce effectiveness in the performance of those TDA (indirect support) functions where recent field experience is important;
- result in a decline in the combat skills of those assigned to CONUS TDA units;
- generate force imbalances, with mismatches between recently promoted noncommissioned officers (NCOs) and the authorized grade structure.

All of these would, potentially, adversely affect readiness. Under the personnel policies that were in effect prior to the drawdown, this shift in authorized positions could lead to CONUS "stagnation" -- unacceptably long tours in CONUS TDA positions, mismatches between the rank and skills of assigned personnel and the positions they fill, and difficulty in transporting soldiers to obtain required professional development and training.

A policy that incorporated greater numbers of CONUS to CONUS operational moves, particularly between CONUS TDA and CONUS TOE units, could offset these potentially adverse effects. However, traditionally, CONUS to CONUS operational moves have been under much greater scrutiny by oversight agencies, with the implication that they were largely the result of waste and mismanagement. For this reason, the Army and the other Services have successfully minimized the number of such moves. However, with many fewer rotational moves to "work with", it may be necessary to reexamine the use of CONUS to CONUS operational moves.

² It is ironic that increases in time on station are, in our context, considered undesirable. In other contexts, such increases mean that personnel turbulence has been reduced, and that the "down" time and period of low productivity surrounding moves to new assignments are reduced. However, in this context, increased time on station in CONUS TDA units means that the soldier will experience longer periods between combat unit assignments. This suggests that there may be a deterioration in combat skills of some soldiers if assigned to TDA units for extended periods.

³ "TDA" units are units whose organization is documented by a Table of Distribution and Allowances (TDA) while "TOE" units are those whose organization is documented by a Table of Organization and Equipment (TOE). In practical terms, TDA units are non-combat indirect support organizations that provide services such as formal school house training, recruiting, and base operation and support. TOE units are combat units.

⁴ See "Enlisted Assignment Pattern Vision," unclassified briefing by Army Personnel Command, undated.

Purpose

The purpose of this report is to present our analysis of the effects of the change in the authorization structure on rotation moves and average time on station (TOS) for soldiers in CONUS. We first estimate the likely effects of changes in the authorization structure on the number of rotational moves, average time on station for soldiers in CONUS, the ability to align people and spaces, and other aspects of the system, to determine how large the changes are likely to be. Next, we develop and analyze alternative ways to offset the effects of the change in billet structure, including changes in OCONUS tour lengths, increases in CONUS to CONUS operational moves, and a combination or hybrid of the two methods. Finally, some additional cases are considered.

Outline of Remainder of the Paper

Section 2 of this report expands upon the methods used in the analysis and, in particular, the structure of the *ithink*⁵ simulation model we use to estimate effects. The assumptions underlying the simulations are also presented in this section. Section 3 presents the results of the analysis in somewhat greater detail. Five primary analysis cases are introduced and described. The results for the five major cases considered, and some excursions around those cases, are presented. The results of the *ithink* model are compared to another Army simulation model, TAPLIM, where possible. Conclusions are presented in section 4.

Methods

Criteria

The relative shift in the authorization structure from OCONUS positions to CONUS positions during the drawdown will result in fewer rotational moves and, other things being equal, an increase in CONUS time on station. However, to determine whether these effects are likely to be large with potentially important implications for personnel policies, or modest effects with little or no significance for policy requires a more formal analysis.

Our method is to simulate the effects of the change in authorizations, over the period FY 1993 through FY 1998. The simulation must be able to capture the effects of the changing authorization structure on:

- PCS moves, including rotational, operational, accession and separation moves;
- average time-on-station for soldiers in CONUS TDA and CONUS TOE positions;
- fill rates of authorized positions.

⁵ *ithink* is a graphical interface software package designed to map, model, and simulate organizational processes.

In addition, the simulation methods should capture interrelationships between rotational policies and retention and promotion rates. For example, if rotational moves serve, in part, to align the force -- match the soldier's rank and military occupational specialty (MOS) with the requirements of the authorized position -- then an issue is the extent to which, given promotion patterns, reduced rotational moves will result in greater mismatches. Offsetting policy action, such as increased CONUS to CONUS operational moves, may be required. Moreover, overall turbulence is a function of retention as well as planned PCS moves. The effect of changes in the authorization structure on overall turbulence cannot be assessed without considering all of the major factors generating that turbulence.

Finally, the simulation methods should have a "what if" capability to analyze changes in key policy variables, such as OCONUS tour lengths, on key outcomes such as CONUS time on station and the number of rotational moves. In particular, the simulation model should be able to provide insights regarding policies to offset any adverse effects of the change in the authorization structure.

Review of Existing Models

The major Army personnel models were reviewed to determine their potential application to this project. To estimate the effects of a changing authorization structure on the key variables of interest, a model must have the capability to simulate, at a minimum, the assignment and PCS process between CONUS and OCONUS, and to count CONUS time on station. Personnel inventory projection models, such as the Enlisted Lost Inventory Model-Computation of Manpower Program (ELIM-COMPLIP) and Enlisted Personnel Inventory Cost and Compensation (EPICC) model, do not have the assignment/PCS rotation features necessary for this analysis. Two models that were considered to be potentially useful were the Total Army Life Cycle Model (TAPLIM) and the personnel flow model of Blacksmith.

TAPLIM is an optimization model where the objective is to minimize the deviation between assigned and authorized positions across the Army. It simulates career progressions, assignments and PCS moves, and accounts for separations. It does not, however, explicitly calculate time-on-station. Time-on-station is estimated from the steady state relationship.⁶ TAPLIM has the following dimensions: geographic location (Alaska, CONUS-TDA, CONUS-TOE, Germany, Hawaii, Japan, Korea, Other), grade (E1-E4, E5, E6, E7, E8, E9), years of service (0,1,.....,34) and time (0,....,9).⁷

The Blacksmith model attempts to estimate Army readiness in a number of dimensions -- materiel as well as personnel -- and simulates the C-rating system for the Army by unit. Blacksmith, *per se*, does not project the inventory of personnel by grade and MOS, but rather

⁶ Time-on-station at the time of a move is calculated as the strength level at that station divided by the number of moves in that period. The problem is that one is rarely in steady state. If not in steady-state, the measure can be very misleading as an indicator of overall time-on-station.

⁷ For additional information regarding TAPLIM, see Durso, Anthony and Scott, Donahue F., (1995). "An Analytical Approach to Reshaping the United States Army," *Interfaces*, Vol. 25, No. 1 (January-February), pp.109-122.

relies on other models, such as MOSLS for inventory projection. The Army Flow Model of the Blacksmith system projects the alignment between authorizations and personnel, by grade, military occupational specialty and unit (unit identification code). It can be used to project the force alignment implications of a reduction in rotational moves due to a relative decline in OCONUS positions. Like TAPLIM, it does not explicitly track time on station. However, the model is quite detailed. Setting up and running a particular case is time intensive, thus Blacksmith is not well suited for exploring a large number of "what if" alternatives.

We use both TAPLIM and Blacksmith in the analysis of the effect of changes in the authorization structure on personnel policies. The Blacksmith model is used to determine if the change in authorization structure, with its associated change in rotational moves, will have an affect on force alignment. While these models provide detail and, presumably, precision in a large number of dimensions relevant to personnel management, neither of these models contain a "time-on-station" dimension, which is particularly important for our analysis. As a result, some key indicator variables, such as time-on-station at a move, must be estimated from implied steady-state relationships. Moreover, the large, detailed data bases and the extensive simulation logic used by Blacksmith and, to a somewhat lesser extent, TAPLIM, make rapid, "what if" types of analyses of alternatives somewhat cumbersome and time consuming. In response to these difficulties, we developed a limited dimension simulation model, but one that is especially designed to estimate the policies and effects that are important to this analysis. This Army rotation model is developed in a software simulation package called *ithink*. The TAPLIM model is used as a check on the results of the *ithink* model. The *ithink* model was developed specifically to analyze the effects of a changing authorization structure on rotational moves and CONUS time on station.

Development of the *ithink* Model of Army Rotation

The *ithink* model was developed as part of this project to obtain a rough estimate of the effect of changes in the authorization structure on rotational moves, CONUS time on station in both TDA and TOE units, and other variables pertinent to the Army's active enlisted force. No existing Army model explicitly tracks time-on-station -- a crucial variable for this analysis. Moreover, neither the Blacksmith model nor the TAPLIM model is built for rapid turnaround "what if" types of analyses. Hence, the development of a simple but fast and flexible model -- one that is structured to address the particular personnel issues associated with fewer rotation moves, provides a needed missing dimension to the analysis that can be done with existing models.

Overview of the *ithink* Model⁸

The model consists of three primary sectors or locations: OCONUS, CONUS TDA and CONUS TOE. Army authorizations for each fiscal year of the simulation are distributed among the three sectors, according to Army plans. The authorization structure may vary by fiscal year. The nine enlisted pay grades are collapsed into three in the model. Grade "G1" consists of grades E-1 through E-4; "G2" consists of grades E-5 and E-6; and "G3" consists of grades E-7 through E-9. Loss rates are specified separately for each grade. Promotions rates may be set for promotions from G1 to G2 and from G2 to G3. Each fiscal year, the model determines separations and promotions, given the rates, and calculates recruits to meet an overall end strength goal.

OCONUS tour lengths are specified as an input. Time on station is tracked for both OCONUS and CONUS positions. When the OCONUS soldier's tour is expired, the soldier rotates to a CONUS position.⁹ Each year, the "demand" for rotational moves to OCONUS is calculated as the number of authorized OCONUS positions less the OCONUS inventory of soldiers after accounting for OCONUS tour expirations and separations. The implicit priority is to fill OCONUS positions first. Deviations between authorized and assigned are only likely to emerge in CONUS positions. Soldiers rotate to OCONUS based on time on station and OCONUS demand, with those with the greatest time on station moving first. Soldiers in CONUS TDA positions move before soldiers in CONUS TOE positions, for a given time on station. In G1, however, recruits are assumed to fill OCONUS first, then CONUS positions. Hence, there are very few rotational moves from G1 CONUS to G1 OCONUS.

The model is dynamic, in that key input variables such as authorizations, OCONUS tour lengths, separation and promotion rates can change over time. In addition, a maximum CONUS time on station may be specified for both CONUS TDA and CONUS TOE units. When soldiers reach the maximum time on station and there is not a demand for a rotational move, a CONUS to CONUS operational move is specified. If the soldier were in a TDA unit, the soldier moves to a CONUS TOE unit, and vice versa.

The model is able to simulate the following policy changes:

- changes in authorization structure;
- changes in OCONUS tour length;
- changes in retention and promotion rates;

⁸ The details of the mathematical structure of the *ithink* model are described in "A mathematical Model for Analyzing the Effect of Changes in the Authorization structure on Army Personnel Policies," Interim Study Report, 12 September 1994. The mathematical structure described in the paper is that of the model actually built, except that the MOS level of detail was dropped in the model built.

⁹ A parameter may be set so that a given proportion of soldiers remain at OCONUS positions for a second consecutive tour.

- maximum CONUS time on station policy;
- changes in end strength.

Key output variables include:

- number and types of PCS moves, by sector and grade;
- assigned versus authorized positions;
- average time on station for those who are moved during the period;
- average time on station for the stock of soldiers assigned to a particular location;
- separations, recruits, and promotions.

Baseline Assumptions in the *ithink* Model

In the analysis conducted using the model, we make the following assumptions regarding separation and promotion rates. Recall that the rates apply to the inventory defined by the entire grade (i.e., G1 includes E-1 through E-4, etc.). These assumptions, shown in Table 1, are maintained throughout all of the cases analyzed.

Table 1

Assumptions Regarding Promotion and Separation Rates

	E1 - E4	E5 - E6	E7 - E9
Promotion Rates	18%	5%	--
Separation Rates	25%	15%	10%

The enlisted authorization structure changes in the following way over the period:¹⁰

Table 2

Enlisted Authorizations

	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998
Positions	459.4	407.0	373.5	345.7	346.1	346.0

¹⁰ The authorization data was taken from the Blacksmith model. It reflects the 9301 PMAD for the FY 93 and FY 94 authorization structure, and NOF 28 for the FY 95 through 98 structure.

In addition, we assume that the pre-drawdown OCONUS tour length is 3 years. These are the assumptions that, with the exception of the OCONUS tour length, remain constant throughout assumptions relatively easily to determine the sensitivity of the overall results, or to estimate results under alternative scenarios that include changes in these variables.

Results

In this section, we present the basic results of the analysis. In the first part of this section, five primary analysis cases are presented. We next present the results of these cases. The effects on CONUS time on station, rotational moves, and other key variables are presented for two "baseline" cases and three policy alternatives. Next, we consider excursions around the three policy alternatives.

Primary Analysis Cases

We consider five primary analysis cases. The first two are "baselines" in that they hold policy variables constant over the simulation period. The first baseline, which we refer to as "B1", is a simulation holding the authorization structure constant at its FY 1993 level. OCONUS tour length policy and policies regarding CONUS to CONUS operational moves are also held constant at those prevailing in FY 1993. The second baseline, which we refer to as "B2", is a simulation that incorporates authorization structure changes through FY 1998, but holds OCONUS tour length and CONUS to CONUS operational move policies constant at those prevailing in FY 1993 -- the policies as in B1.

The first alternative case, "A1", is a simulation that uses the planned authorization structure through FY 1998, but reduces OCONUS average tour length by one year -- from an average of three years to an average of two years. Policies regarding CONUS to CONUS operational moves remain constant at those prevailing in FY 1993. The second alternative, "A2", also assumes that the authorization structure changes as planned over the period. OCONUS tour lengths are held constant, as in the baseline cases, but a maximum CONUS time on station policy is simulated. Under this policy, if a soldier's time on station in CONUS reaches four years, a CONUS to CONUS operational move is executed. If the soldier was in a TDA unit, the operational move is to a TOE unit, and vice versa. The third alternative policy case, "A3", is a hybrid of the previous two. Instead of reducing average OCONUS tour length by one year, as in A1, it is reduced by half a year, to 2.5. The maximum CONUS time on station is set at five years, rather than four as in A2.

The primary analysis cases are summarized in Table 3.

Table 3

Primary Analysis Cases				
Case	Authorizations	OCONUS Average Tour Length	Maximum Time on Station	Comment
B1	Constant, FY 93	3.0	_____	Simulates changes as if there were no change in authorization structure or policies.
B2	Planned FY 93-98	3.0	_____	Simulates changes under planned authorization structure, but no changes in policies.
A1	Planned FY 93-98	2.0	_____	Reduces OCONUS tour length by one year, stimulating more rotational moves.
A2	Planned FY 93-98	3.0	4 years	Implements 4 year maximum CONUS time on station policy.
A3	Planned FY 93-98	2.5	5 years	"Hybrid" between A1 and A2.

Results for Primary Cases

We simulated each of the five primary cases over the period FY 1993 through FY 1998 using the *ithink* model. In some cases, we also present results from the TAPLIM model for comparison purposes. The key outcome variables considered include:

- **Number of rotational moves.** The change in the number of rotational moves over the period is important because it will affect CONUS time on station and CONUS "stagnation". Moreover, NCOs have traditionally obtained professional development education and training necessary for advancement by traveling to installations providing ANCOC and BNCOC training as part of a rotational move. A decline in rotational moves could affect the ability of the Army to provide this education to NCOs in the way it has done so historically. Finally, rotational moves provide a routine opportunity to align the force -- to ensure a match between the soldier's MOS and grade and that of the authorized position that the soldier occupies. A reduction in rotational moves may reduce these opportunities and, without offsetting policies, create imbalances.
- **CONUS time on station.** CONUS time on station measures the duration of CONUS assignments. We measure CONUS time on station in two ways. The *flow* measure is the average CONUS time on station in the period for those soldiers who move from a CONUS assignment during the period. The *stock* measure of average CONUS time on station is a weighted average of the time on station of all soldiers stationed in CONUS during the period. The latter measure is, in our opinion, more reliable in the sense that it is less vulnerable to spurious fluctuations. The former may prove a misleading estimate of CONUS "stagnation" to the extent that it reflects the time on station only of soldiers that moved during the period. We report the stock measure of average time on station here.
- **Ratio of promotions to rotational moves.** The decline in rotational moves may make it more difficult for soldiers to travel to installations to obtain necessary professional education. It also may make it more difficult to assign recent promotees to positions at the higher grade. This measure -- the ratio of promotions to rotational moves in the period -- will indicate the extent to which rotational moves may decline relative to promotions.
- **Force alignment.** This measure provides the ratio of assigned personnel to authorized positions, by grade, for E-5s and E-6s (G2), and E-7s, E-8s and E-9s (G3).
- **CONUS to CONUS operational moves.** This measure is the *increase* in CONUS to CONUS operational moves estimated to result from establishing a maximum CONUS time on station policy.

The effects of the alternative cases on rotational moves is shown in Table 4. In comparing case B1 to B2, the *ithink* model projects that rotational moves will decline by 11% in the near term (FY 95) and by about 34% in the longer term (FY 1998) due to the change in authorization structure over the period. However, decreasing OCONUS tour length by one year, represented by case A1, generates rotational moves that exceed the numbers predicted if there were no change in authorization structure (B1). Increasing CONUS to CONUS operational

moves (A2) has no effect on rotational moves, while a 'hybrid' case that includes decreasing OCONUS tour length by a half of a year results in an increase in rotational moves that exceeds the level of the B1 case in the near term, but is in between the B1 and B2 case in the longer term.

The TAPLIM model was used to simulate the effects of cases B1, B2, and A1 on rotational moves. In general, the TAPLIM estimates are consistent with those of the simpler *ithink* model.

Table 4

Rotational Moves (thousands)		B1	B2	A1	A2	A3
ithink	FY 1995	63.0	55.6	102.9	55.6	72.1
	FY 1998	65.6	42.9	73.0	42.9	54.3
TAPLIM	FY 1995	56.7	53.5	90.0		
	FY 1996	60.6	44.4	72.7		

Fewer rotational moves will manifest itself, other things being equal, by increasing CONUS average time on station and resulting in CONUS "stagnation". The estimates for the alternative cases of average CONUS time on station is shown in Table 5. Average time on station, used here, is estimated as the weighted average of the time on station of each soldier in CONUS. If authorizations were to remain constant at the FY 1993 level, average CONUS time on station would increase somewhat for grades E-1/E-4 (G1) and E-7/E-9 (G3), and decline slightly for E-5/E-6 (G2). Though there are increases in average CONUS time on station with the changes in the authorization structure, the increases are relatively modest. With planned changes in the authorization structure, average time on station will rise slightly for the "G1" grades, and by FY 1998 will have risen by 0.6 of a year for the middle grades and by 0.7 years for the senior enlisted grades. However, virtually any of the policy alternatives reduce average CONUS time on station to levels near, or below, the predicted levels if the authorization structure had remained constant.

Table 5

CONUS Time on Station (Average of CONUS Inventory)		B1	B2	A1	A2	A3
E1/E4	FY 1995	1.84	2.23	1.82	1.84	2.16
	FY 1998	2.06	2.17	1.96	1.79	2.06
E5/E6	FY 1995	2.74	2.87	2.29	2.35	2.80
	FY 1998	2.64	3.23	2.40	2.43	2.82
E7-E9	FY 1995	3.33	3.42	2.86	2.40	3.32
	FY 1998	3.81	4.50	3.41	2.81	2.89

One of the potential problems associated with fewer rotational moves is that there may be less opportunity for promotion candidates to obtain the professional education necessary to advance to NCO and senior NCO. In the *ithink* model, which has only three aggregate grades, promotions are calculated from E-4 to E-5 and from E-6 to E-7. Promotions are determined by a fixed promotion rate, so that a decline in strength will, with a fixed rate, ultimately result in fewer promotions.¹¹

Table 6

Ratio of Promotion to Rotational Moves					
	B1	B2	A1	A2	A3
FY 1995	0.33	0.30	0.16	0.30	0.23
FY 1998	0.33	0.33	0.19	0.33	0.26

Table 7

Changes in CONUS Operational Moves (thousands)					
	B1	B2	A1	A2	A3
FY 1995	--	--	--	20.6	4.9
FY 1998	--	--	--	24.3	7.8

The *ithink* model is not ideally suited to address force alignment issues. It does not have an MOS dimension, for example. Moreover, it is structured logically to move and promote soldiers according to fixed rules, rather than to optimize the match between authorized and assigned positions. For these reasons, the Blacksmith model and, to a lesser extent, the TAPLM model were used to address force alignment issues. According to an analysis conducted using the Blacksmith model, the changes in the authorization structure considered here will not result in decrease in personnel readiness, as measured by the ratio of assigned to authorized position.¹²

The ratio of assigned to authorized positions for each of the cases, estimated using the *ithink* model, is shown below in Table 8, for CONUS G2 and G3, TOE and TDA authorized

¹¹ The actual rates can, of course, be set and revised by the user. By iterating, one can set promotion rates which are the equivalent of vacancy driven.

¹² The results of the Blacksmith model in analyzing changes in personnel readiness between the cases that are equivalent to B1 and B2 is summarized in the following quotation, taken from paragraph 7, of a memo dated 18 November, 1994; subject: Impact of the CONUS/OCONUS Force Structure Imbalance on Tour Length:

"The effect on readiness is easier to assess since this is defined in AR-220-1. Using the Enlisted Distribution Module and the same conditions set in the base case, we observed the change in readiness over time for all units. There is no appreciable increase in the number of units C-2 (units that possess the resources and have accomplished the training necessary to undertake the bulk of the wartime mission for which they are organized or designed.) or below, other than a slight increase at the end of the run period."

positions. Note that the logic of the model insures that OCONUS positions are staffed at 100% of authorizations.

Given the model's promotion opportunity from G2 to G3 (5%) it appears that, in most cases, an excess supply of personnel in CONUS G3 TDA positions emerges. The excess is lower, in FY 1998, in those cases (A2, A3) that have a maximum CONUS time on station policy.

Additional Results

In this section, we consider two additional cases. The first case, which we call A1', is similar to case A1 except that we reduce OCONUS tour length to 1 year, rather than 2 years. The second case, which we call A2', is similar to case A2, except that we set the maximum CONUS time on station to 3 years rather than 4 years.

Table 8

Ratio of Assigned to Authorized Positions			B1	B2	A1	A2	A3
E5-E6							
TDA	FY 1995		0.95	1.09	1.19	1.13	1.09
	FY 1998		0.81	0.98	1.00	0.95	0.93
TOE	FY 1995		0.87	0.96	0.78	0.88	0.96
	FY 1998		0.91	0.81	0.77	0.87	0.91
E7-E8							
TDA	FY 1995		1.16	1.38	1.45	1.50	1.37
	FY 1998		1.18	1.60	1.60	1.19	1.40
TOE	FY 1995		0.88	0.90	0.86	0.81	0.92
	FY 1998		0.87	0.81	0.84	1.13	1.00

Table 9 shows the effect of cases A1' and A2' on average CONUS time on station. A1', an OCONUS tour length of 1.0, dramatically reduces average time on station for G1 and G2 grades. Its reduction for G3 average CONUS time on station is less than the reduction resulting from a maximum CONUS time on station policy of 3 years. This is undoubtedly due to the relative small proportion of G3 positions that are OCONUS, compared to G1 and G2 positions.

Table 9

Average CONUS Time on Station: Additional Cases

		B1	B2	A1	A1'	A2	A2'	A3
E1-E4	FY 1995	1.84	2.23	1.82	1.06	1.84	1.60	2.16
	FY 1998	2.06	2.17	1.96	1.31	1.79	1.56	2.06
E5-E6	FY 1995	2.74	2.87	2.29	1.43	2.35	1.87	2.80
	FY 1998	2.64	3.23	2.40	1.66	2.43	1.94	2.82
E7-E9	FY 1995	3.33	3.42	2.86	1.85	2.40	1.94	3.32
	FY 1998	3.81	4.50	3.41	2.36	2.81	1.98	2.89

The cost, in terms of additional rotational moves, is quite substantial for alternative A1'. We estimate, using the *ithink* model, that rotational moves under alternative A1' will increase to 128,000 in FY 1998. For alternative A2', which reduces the maximum CONUS time on station to 3 years, the change in the number of CONUS to CONUS operational moves, compared to A2, is generally substantial. However, it is sensitive to the years at which the comparison is made. In FY 1998, we estimate about 24,000 operational moves under both A2 and A2'. However, in FY 1997, the model estimates about 40,000 operational moves under A2', compared to about 16,000 under A2.

Summary and Conclusions

The drawdown and restructuring in active duty forces in the Army following the end of the Cold War has come disproportionately from overseas positions. Authorizations will change from a 55%-45% CONUS-OCNUS proportion in the pre-drawdown period to about 70%-30% after the drawdown. A concern of Army staff in personnel policy is that a shift in position structure of this magnitude will have a significant, and potentially adverse, effect on the Army, unless policies are adjusted to accommodate the changing structure.

In particular, fewer rotational moves may mean that the average time on station for soldiers in CONUS will rise. Readiness may suffer as soldiers in CONUS TDA units begin to lose their combat skills. Moreover, the Army has traditionally used rotational moves as an opportunity to allow its non-commissioned officers to pick up needed professional development training at installations en route to their PCS. With fewer rotational moves, the opportunity to obtain this training in this manner will be reduced. Finally, fewer rotational moves means that there will be less opportunity to "rebalance" the force when individual soldiers are promoted or separate.

Using a variety of simulation models and, in particular, an *ithink* model designed specifically for this analysis, we analyzed the effect of the changing authorization structure on average CONUS time on station, the number of rotational moves, and other variables. We found that the relative changes in the authorization structure will result in about 25-30% fewer rotation moves in FY 1998. However, because the numbers of promotions will decline also, due to

smaller overall force sizes, the ratio of promotions to rotational moves -- an indication of the degree to which the Army will be able to continue using stopovers en route during rotational moves as a way to provide professional development to NCOs -- remains about the same. Hence, it does not appear that a decline in rotational moves will significantly constrain the professional development of NCOs.

Average CONUS time on station will increase by about a half of a year, by FY 1998, for the mid-level and senior NCOs, according to our estimates. This is an increase on the order of about 20% in average CONUS time on station, for these grade levels, in FY 1998, compared to estimated average time on station if the authorization structure were to remain constant at the FY 1993 level. Average CONUS time on station increases only marginally for soldiers in grades E-4 and below. Higher separation and promotion rates keep this grade group from CONUS "stagnation".

The policies we examined to offset potential CONUS stagnation appear more than adequate. A policy of reducing OCONUS tour length by one year significantly increases rotational moves, and reduces average CONUS time on station, by FY 1998, to below what it would have been had there been no change in authorization structure. We also analyzed a policy of reducing OCONUS tour length by two years. This policy would substantially increase PCS costs, if tours were accompanied. Moreover, the turbulence in OCONUS and its effect on readiness would probably more than offset the benefits of reduced CONUS time on station.

A policy of introducing a 4 year maximum CONUS time on station also prevents CONUS stagnation. This policy comes at a cost of about 20,000 CONUS to CONUS operational moves per year. A 4 year maximum, moreover, seems more than adequate. A simulation of a 3 year maximum CONUS time on station policy suggests that the resulting average time on station would be substantially below what it would have been were the authorization structure to remain constant, and the increase in operational moves would be substantial.

There is little indication, from the simulations conducted as part of this project, that the changes in authorization structure will substantially reduce unit level personnel readiness. The evidence, coming largely from the Blacksmith model simulations, suggests that there will not be a significant increase, under current personnel policies, in the number of units reporting readiness levels below C-2. Moreover, the simulations from both TAPLIM and *ithink* suggest that modest adjustments in policies could serve to offset any adverse effects, should they arise.

Overall, the *ithink* simulations suggest that the potential problems posed by the change in authorization structure will not be severe, and that policies can be adapted to offset any potentially adverse effects. Simulations using the Blacksmith model and the TAPLIM model generally produce implications that are qualitatively similar to those of the *ithink* model simulations, when the cases analyzed are similar.

References

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